# Answer Key
# Part I

**Q1:**
Answer: D

**Q2:**
Answer: C

**Q3:**
Answer: C

**Q4:**
Not covered
fprint will not be tested

**Q5:**
Not covered

**Q6:**
Answer: D

**Q7:**
Answer: C

**Q8:**

```
clear; clc;
format long; % this line can be left out
A(4,4)=0;
for i=1:4
  for j=1:4
     A(i,j) = 10^(j-i);
  end
end
A
```

**Q9:**

(A) answer:

```
    0     0     1     1
```

(B) answer:

```
    0     2     1     1
```

**Q10:**

None of the answers is correct. For the following matlab code, the correct answer is:

%% matlab code for the above image. Note the difference in the follow two lines:
%% imagesc ((M>0.5)+ (M>0.7))
%% imagesc (M>0.5 + M > 0.7)
%% IMPORTANT: the order of the operations: parenthesis, arithmetic operations, logical operations, and conditional operations.

```
M=[0.1, 0.5, 0.7; 0.9, 0.4, 0.6; 0.5, 0.8, 0.2];
colormap(M);
imagesc((M>0.5) + (M >0.7) )
axis square off
```

**Q 11:**

Answer: B

**Q12:**

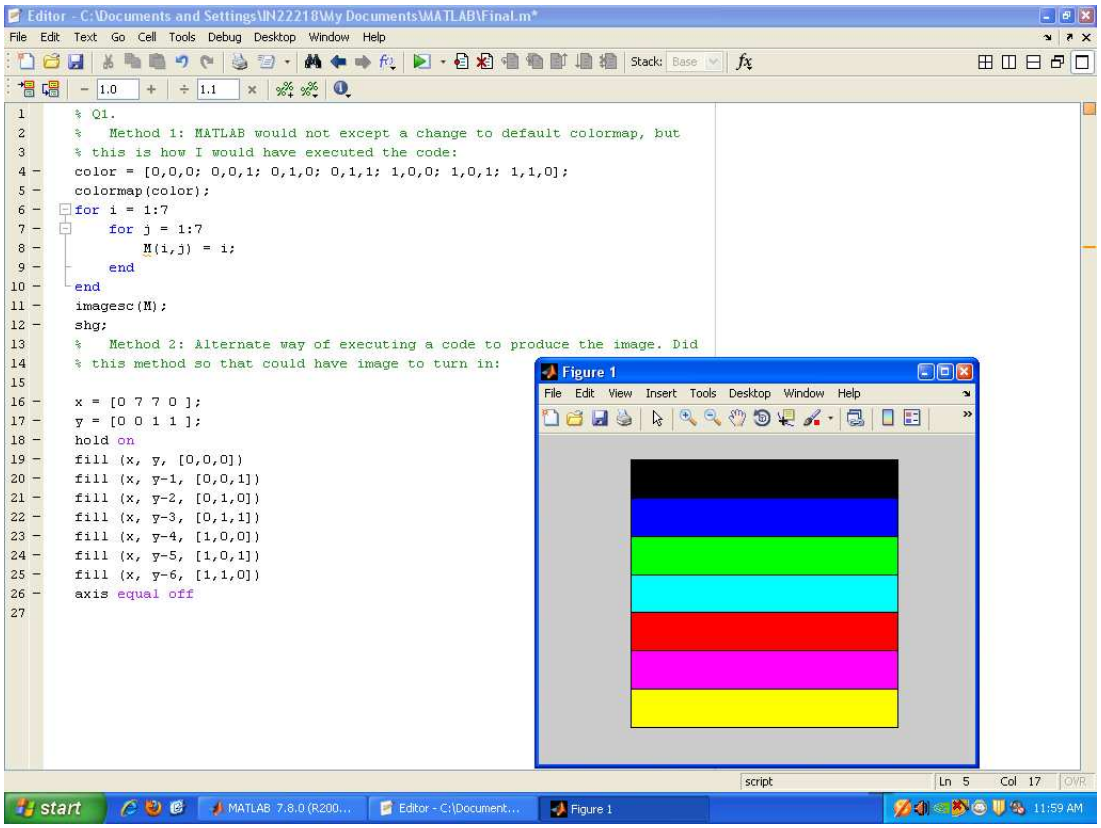
```
clc; clear;
total = 0;
i=3;
while total <100000
  sum = 0;
```

```
  for j=1:i-1
     sum = sum+j;
  end
  total = total + i* sum;
  i = i+1;
end
i
```

# Part II

```
% Q1.
%   Method 1: MATLAB would not except a change to default colormap, but
% this is how I would have executed the code:
color = [0,0,0; 0,0,1; 0,1,0; 0,1,1; 1,0,0; 1,0,1; 1,1,0];
% colormap(color);
for i = 1:7
    for j = 1:7
        M(i,j) = i;
    end
end
imagesc(M);
shg;
%   Method 2: Alternate way of executing a code to produce the image. Did
% this method so that could have image to turn in:

x = [0 7 7 0 ];
y = [0 0 1 1 ];
hold on;
fill (x, y, [0,0,0]);
fill (x, y-1, [0,0,1]);
fill (x, y-2, [0,1,0]);
fill (x, y-3, [0,1,1]);
fill (x, y-4, [1,0,0]);
fill (x, y-5, [1,0,1]);
fill (x, y-6, [1,1,0]);
axis equal off;
```



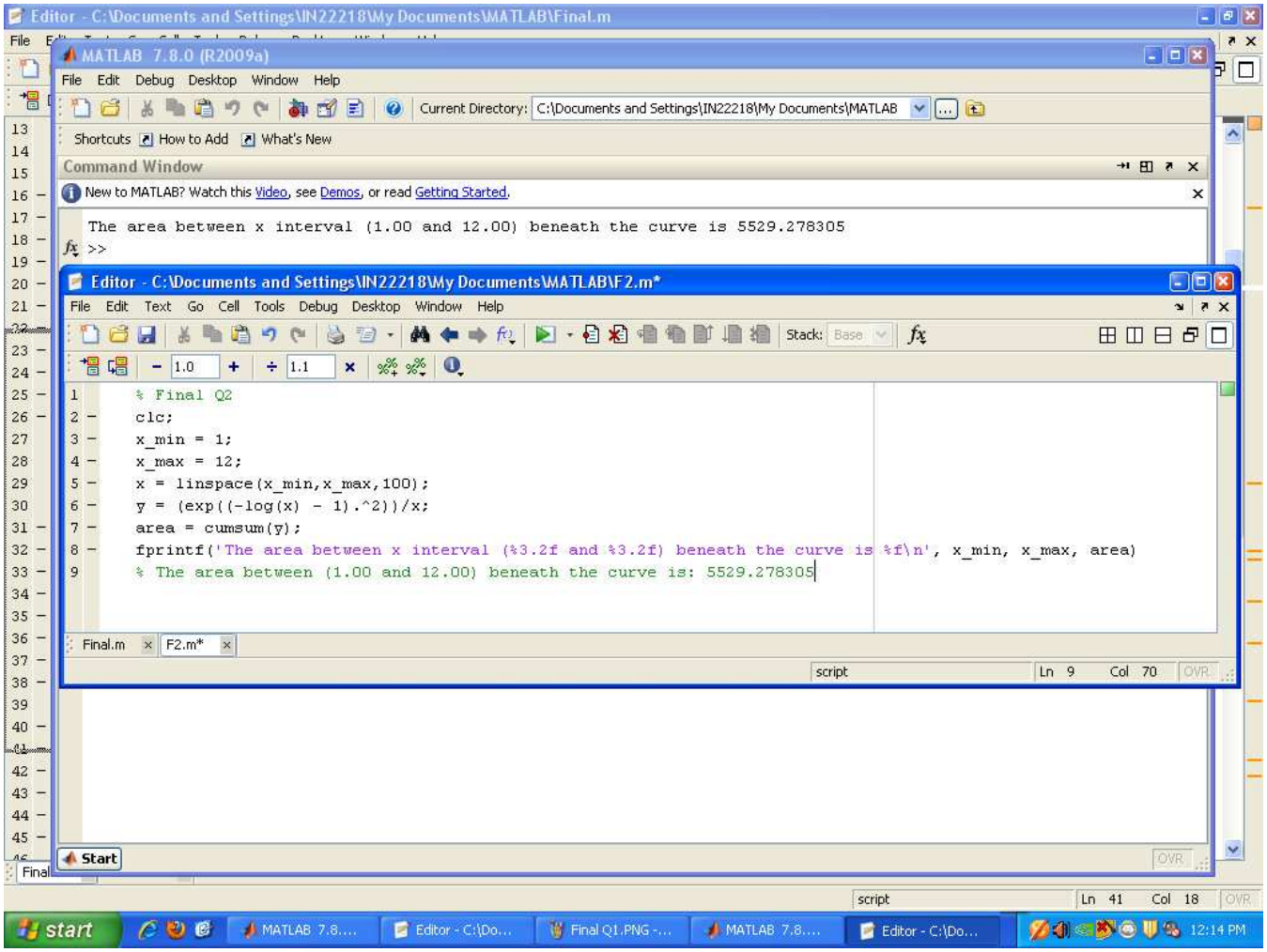

```
%Q2.
%% solution 1
%% NOTE: the usage of the dot operator for element by element arithmetic
%% .^
%% .*
%% ./


clc;
x_min = 1;
x_max = 12;
dx = 0.01;
imax = (x_max - x_min)/dx +1;
x = x_min:dx:x_max;
y = (exp((-log(x) - 1).^2))./x;
area = 0;
for i=1:imax-1
    area = area + y(i) * dx;
end
area



%% solution 2
clc;
x_min = 1;
x_max = 12;
x = linspace(x_min,x_max,100);
y = (exp((-log(x) - 1).^2))/x;  %NOTE: Dividing by x is the same as
multiplying by 1/x
```

```
area = cumsum(y);
fprintf('The area between x interval (%3.2f and %3.2f) beneath the curve is
%f\n', x_min, x_max, area);
% The area between (1.00 and 12.00) beneath the curve is: 5529.278305
```




```
%Q3.
% Final Q3:
B_initial = 500;
B(1) = B_initial;
r1 = 0.8;
r2 = 1.2;
for i = 1:15
```

```
    if i <= 10
        B(i+1) = B(i) + B(i)*r1;
    elseif i > 10
        B(i+1) = B(i) + r1*(B(i) - (B(i)*r2)); %Notice that the growth rate
is being multiplied
    end                                        % by the amount minus the
death rate
end
B(2)   % ans = 900
B(6)   % ans = 9.4478e+003
B(10)  % ans = 9.9180e+004
fprintf('The amount of bacteria after 15 hours is %f', B(15))
% At the 15th hour there are 88881.668698 bacteria
```